



## Original Communication

## The socio-demographic profile of hanging suicides in Ireland from 1980 to 2005

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## ABSTRACT

This paper provides a comparison of the socio-demographic profile of hanging suicides and suicides by other means in Ireland from January 1st 1980 to December 31st 2005. Data on 9674 suicides occurring in that time frame was provided by the Central Statistics Office of Ireland (CSO). 4031 (42%) of these deaths involved suicide by 'hanging, suffocation or strangulation' (HSS), with the remainder being suicides by other means. Binary logistic regressions were used to examine six potential risk factors for suicide across the two groups: Gender, marital status, employment in the agricultural sectors, residential location (urban/rural) and age were entered in Block 1 of the analysis, with year of death (pre 1994 vs. post 1994) added in a second block. Results indicate that those dying through hangings were statistically more likely to be male (OR = 3.1, 95% CI = 2.8–3.5), single (OR = 1.3, 95% CI = 1.2–1.4), rural-dwelling (OR = 1.1, 95% CI = 1.0–1.2), agri-employed (OR = 1.3, 95% CI = 1.1–1.4) and to have died since 1994 (OR = 2.3, 95% CI = 2.1–2.5). The magnitude of the group effect was moderate for all but the gender and time period comparisons. Hanging suicide victims ( $m = 37.7$ ,  $sd = 16.7$ ) were also significantly younger than other suicide victims (mean = 42.72,  $sd = 16.7$ ), although the size of the effect was small ( $r = .16$ ). Overall the six variables explained 6% of the variance in the criterion variable.

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## 1. Introduction

Suicide remains a pressing concern worldwide. Despite tentative evidence that mortality rates are decreasing in some parts of Europe, it remains one of the single greatest causes of death, particularly among young males.<sup>1</sup> In Ireland, for instance, annual suicide deaths are comparable to the annual death toll from road traffic collisions and hovered around 400 deaths per year from 2000 to 2004 (10.7 deaths per 100,000 population per annum).

In Ireland, and elsewhere, hanging is the leading cause of suicide accounting for more than 40% of all suicide deaths here. Indeed the dramatic increase in suicides since 1980 is largely attributable to an increase in hangings suicide rates in that time. In the 1980s the average annual hanging prevalence per 100,000 population was 2.1. In the 1990s this rose to 4.6 and from 2000 to 2005 the average prevalence was 7.3. It is argued here that any attempt to uncover the relevant risk factors for hanging is welcome given this context.

There have been some recent attempts to uncover risk factors for hanging in comparison to other suicide methods. One study compared hanging suicide with all other suicides in Lithuania and reported that hanging deaths were more likely to be male (OR = 2.4) and rural-dwelling (OR = 2.0) than other suicide victims. These

victims were also older and have lower levels of education.<sup>2</sup> A second study compared hanging, firearms and non-domestic gas suicides among males in Queensland, Australia, and found that males who died through hanging were more likely to have had a history of suicide attempts than those who used a firearm, and were more likely to have been co-habiting with another, to have had 'legal trouble' and to have died in their private residence than those dying through non-domestic gas suicide.<sup>3</sup> These, and other studies,<sup>4,5</sup> are strongly suggestive of the presence of distinct risk-profiles across suicide victims and the potentially profound implications for primary and secondary suicide prevention cannot be ignored.

## 2. Methods

The Central Statistics Office of Ireland (CSO) maintains a register of all suicides occurring in Ireland. For the purposes of this analysis, suicides occurring between January 1st 1980 and December 31st 2005 were included. Data for more recent years is incomplete due to delays holding inquests.

The CSO data set codes suicide type using ICD9 codes and under nine headings. In this analysis we split all suicides into two groups, 'hanging, strangulation or suffocation' (IC9 code 953) ( $n = 4031$ ) (HSS) and all other suicides ( $n = 5643$ ) (Non-HSS).

Five socio-demographic variables were included in the design: Gender; place of residence; employment type, marital status and

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age. 'Place of residence' was coded as 'urban' or 'rural' using CSO counting rules. 'Employment type' was coded as 'agri-employed' or 'not agri-employed' and marital status as 'married' or 'not married'. Finally an examination of frequency polygons suggested that hanging suicides increased dramatically since 1994, and a variable splitting all suicides into pre 1994 and post 1994 was created to determine the extent to which time period might predict HSS deaths.

Gender, place of residence, employment type, marital status, time period and age were examined using forced entry logistic regression (through SPSS), with suicide type as the criterion variable. As time period is not a socio-demographic variable and was included speculatively in the model, it was added in the second stage of a two-step regression. Also reported here are odds ratios (ORs), associated 95% confidence intervals and significance values for each variable. The age comparison was based on a Mann Whitney U test of difference across two samples.

### 3. Results

Suicide deaths per 100,000 population have increased dramatically in Ireland over the last three decades. In the 1980s on average 7.4 deaths per 100,000 were recorded each year. By the 1990s this had increased to 11.5. From 2000 to 2006, 13.2 deaths per 100,000 were registered each year.

A cursory longitudinal analysis would tend to suggest that this increase in primarily attributable to a large increase in HSS suicides (see Fig. 1). The average annual hanging rate per 100,000 increased from 2.1 in the 1980s, to 4.6 in the 1990s and 7.3 in the period 2000–2006. Since 2000 HSS suicides have outnumbered all other suicide types combined.

There are differences in suicide method choice across gender, with males more likely to die through hanging (47%,  $n = 3575$ ) and females through poisoning by 'solid or liquid substance' (32%,  $n = 662$ ). Suicide by drowning was the second most common suicide method, comprising (24%,  $n = 2280$ ) of all suicide deaths.

In terms of the risk factors included in this study, suicides in Ireland are most commonly by males (79%,  $n = 7615$ ). Those living in rural settings are also over-represented (77%,  $n = 7367$ ). Seventeen percent ( $n = 1674$ ) were employed as farmers, relatives assisting farmers, farm labourers, farm managers or fishermen and 65% were not married.

HSS deaths were statistically more likely to be male (OR = 3.1, 95% CI = 2.8–3.5) than those committing suicide through all other means (see Table 1). They were also significantly more likely to be single (OR = 1.3, 95% CI = 1.2–1.4), rural-dwelling (OR = 1.1, 95% CI = 1.0–1.2), agri-employed (OR = 1.3, 95% CI = 1.1–1.4) and to have died since 1994 (OR = 2.3, 95% CI = 2.1–2.4). It is important to note here that the magnitude of the group effect was small for all but the gender and time period comparisons.

HSS deaths were 2.3 times more likely to have occurred in the post 1994 period than non-HSS deaths. This supports the picture emerging from the frequency polygon that HSS deaths increased dramatically since 1994, while non-HSS deaths did not increase (see Table 1).

Finally, it emerged that those dying through HSS were also significantly younger ( $m = 37.7$ ,  $sd = 16.7$ ) than other suicide victims (mean = 42.72,  $sd = 16.7$ ), although again the size of the effect was small ( $z = 15.4$ ,  $p < .0005$ ,  $r = .16$ ).

A forced entry logistic regression was conducted to determine the ability of these variables to predict suicide method (see Table 2). Gender, place of residence, marital status, agri-employment and age were entered as one block in the analysis. Subsequently time period was entered (Block 2). The first model was statistically significant ( $p < .0005$ ) but explained just 4% of the variance in the criterion variable. Gender, agri-employment, and age, independently of other factors, significantly influenced choice of suicide method. When time period was added to the model in Block 2, the model explained an additional 2% of the variation in the criterion and overall the new model accounted for 6% of this variance.

### 4. Discussion

The aim of this study was to assess the socio-demographic profile of hanging suicides relative to all other forms of suicide in Ireland between 1980 and 2005. The overall picture emerging here is that HSS deaths were significantly more likely to be male, rural-dwelling, single, agri-employed and younger than other suicide deaths, but that the differences were of a small magnitude for all variables but gender. The findings also point to a dramatic increase in HSS deaths since 1994.

The lower bound 95% confidence interval for 'place of residence' was 1.0, suggesting that there may be no difference in this risk

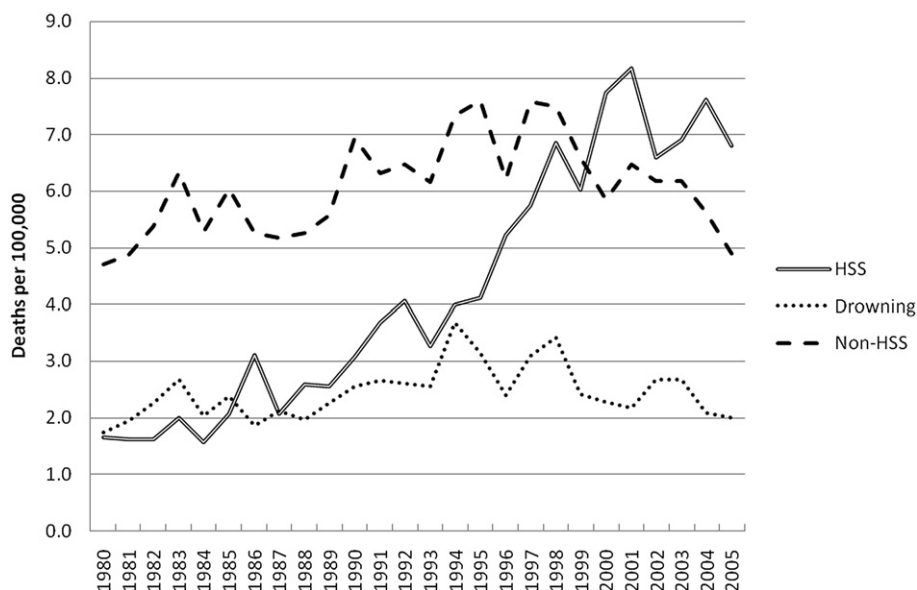


Fig. 1. Suicide deaths per 100,000 from 1980 to 2006.

**Table 1**

Odds ratios, 95% confidence intervals and significance value for each risk factor.

Risk factor	HSS		Non-HSS		OR	95% CI		Sig.
	n	%	n	%		Upp.	Low.	
<i>Gender</i>								
Male	3575	88.7	4040	71.6	3.1	2.8	3.5	<.0005
Female	456	11.3	1603	28.4				
<i>Place of residence</i>								
Rural	3150	78.1	4290	76.0	1.1	1.0	1.2	<.02
Urban	881	21.9	1353	24.0				
<i>Marital status</i>								
Not Married	2785	69.1	3556	63.0	1.3	1.2	1.4	<.0005
Married	1246	30.9	2087	37.0				
<i>Agri-employment</i>								
Farm employed	708	30.3	866	25.7	1.3	1.1	1.4	<.0005
Not Farm Employed	1629	69.7	2510	74.3				
<i>Time period</i>								
Post 1994	2819	69.9	2881	51.1	2.3	2.1	2.4	<.0005
Pre1994	1212	30.1	2762	48.9				

factor across the two groups. Odds ratios for the other risk factors, however, would suggest that there are distinct, if subtle, differences in risk factors for death by hanging. Most salient is the gender difference, with males forming a greater proportion of hanging deaths than non-hangings. With the exception of firearms suicides, which form a very small proportion of suicides here, hanging is the most lethal suicide method recorded and international research has suggested that males are more likely to be attracted to the more lethal and violent suicide methods than females.<sup>2,4,6–12</sup> Echoes of this are found in the suicide trends here. The most common suicide method among females in Ireland is poisoning, generally accepted to be a less lethal approach than hanging, which is the most common method among males.

Past research has reported that being single or divorced is a risk factor for suicide,<sup>6,13</sup> and that marriage is a protective factor.<sup>14</sup> Comparisons in marital status across suicide methods, however, are relatively rare. One study reported that hangings by males was associated with the end of a relationship,<sup>15</sup> but no specific relationship has been uncovered between hanging and 'being single' in other studies.<sup>2,5,16</sup> Our finding that HSS deaths are more likely to be single than other suicides, therefore, requires further research.

Similarly mixed findings have been reported for age differences across suicide method. In our study those suiciding through hanging were younger than those suiciding through other methods but the magnitude of the difference was very small indeed. There have been mixed findings in international research,<sup>2,3</sup> and all that can be concluded here is that further exploration of the link between age and suicide method requires further in-depth exploration.

HSS suicides were also proportionately more likely to be rural dwelling and agri-employed than non-HSS deaths. Again there have been mixed findings in the international research,<sup>2,3,5,8</sup> but in

the Irish context may be linked to access to suitable environments (secluded woodland areas, farm out-buildings) materials (ropes and accessible suspension points) and knowledge of how to successfully complete hangings being greater in rural and agricultural settings.

The inclusion of these predictor variables in a forced entry logistic regression yielded a poor model fit of 6%. This is likely to reflect the similarity in socio-demographic profile across the two groups and the limited variables included in the model. The inclusion of a more comprehensive of situational and dispositional factors would have provided an opportunity to test a more sophisticated model and should lead to a more compelling predictive equation.

The contribution of the 'time period' variable to the model fit points to the dramatic increase in hangings since 1994. The odds ratio suggests that while non-HSS deaths have remained largely static across the two time periods, HSS deaths have doubled. This was further supported by the addition of time period in Block 2 of the logistic regression, and which led to an improvement of the model fit. In essence this suggests that suicides since 1994 tend to be predictive of HSS deaths, and thus that a greater proportion of recent suicides have been hangings, strangulations and suffocations, in comparison to the pre-1994 period. Interestingly, when we examine the two most common suicide methods since 1994, hanging and drowning, there seems to be some in-step discordance year on year. Periods where drowning increased, hanging decreased, and vice-versa (see Fig. 1).

In terms of the limitations of the study, it is important to note that the study was framed by the data routinely recorded by the CSO. Of the six variables included in this study, two merit comment here. Place of residence was coded as urban/rural, with the five major cities in Ireland (Dublin, Galway, Cork, Limerick and Waterford) forming the urban sample and all others the rural sample. Thus many deaths occurring in large urban towns were coded as being rural dwellers. Unfortunately, the CSO dataset does not permit isolation of rural and semi-urban deaths.

Second, there was inconsistent reporting of employment status within the data set, with a large number of missing values ( $n = 3961$ ) and past research has suggested that those unemployed may be under-represented in the sample that was included in this analysis. That is, there may be a greater tendency to not report employment status at time of death when the deceased in not employed.<sup>17,18</sup>

**Table 2**

Potential predictors of suicide method (i.e. hanging vs. method other than hanging).

	Factor	$\beta$	Standard error	p
Block 1	Gender	1.04	0.08	0.0005
	Rural	0.039	0.075	0.59
	Agri	−0.255	0.067	0.0005
	Not married	0.025	0.06	0.67
	Age	−0.013	0.0002	0.0005
Block 2	Death period	0.794	0.059	0.0005

R<sup>2</sup> Block 1 = .04, Total R<sup>2</sup> = .06.

### Conflict of Interest

There are no conflicts of interest in this research.

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### Ethical Approval

Ethical approval was not required for this research.

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### References

- Chishti P, Stone DH, Corcoran P, Williamson E, Petridou E, Group EW. Suicide mortality in the European Union. *Eur J Public Health* 2003;**13**(2):108–14.
- Starkuviene S, Kalediene R, Petrauskiene J. Epidemic of suicide by hanging in Lithuania: does socio-demographic status matter? *Public Health* 2006;**120**(8):769–75.
- De Leo D, Evans R, Neulinger K. Hanging, firearm, and non-domestic gas suicides among males: a comparative study. *Aust NZ J Psychiat* 2002;**36**(2):183–9.
- Varnik A, Kolves K, van der Feltz-Cornelis CM, Marusic A, Oskarsson H, Palmer A, et al. Suicide methods in Europe: a gender-specific analysis of countries participating in the European alliance against depression. *J Epidemiol Commun Health* 2008;**62**(6):545–51.
- Pirkola S, Isometsa E, Lonnqvist J. Do means matter? Differences in characteristics of Finnish suicide completers using different methods. *J Nerv Ment Dis* 2003;**191**(11):745–50.
- Schapira K, Linsley KR, Linsley JA, Kelly TP, Kay DWK. Relationship of suicide rates to social factors and availability of lethal methods. *Brit J Psychiat* 2001;**178**:458–64.
- Ajdacic-Gross V, Weiss MG, Ring M, Hepp U, Bopp M, Gutzwiller F, et al. Methods of suicide: international suicide patterns derived from the WHO mortality database. *Bull World Health Organ* 2008;**86**(9):726–32.
- Kosky RJ, Dundas P. Death by hanging: implications for prevention of an important method of youth suicide. *Aust NZ J Psychiat* 2000;**34**(5):836–41.
- Bennewith O, Gunnell D, Kapur N, Turnbull P, Simkin S, Sutton L, et al. Suicide by hanging: multicentre study based on coroners' records in England. *Brit J Psychiat* 2005;**186**:260–1.
- Denning DG, Conwell Y, King D, Cox C. Method choice, intent, and gender in completed suicide. *Suicide Life-Threat Behav* 2000;**30**(3):282–8.
- Hawton K. Sex and suicide. Gender differences in suicidal behaviour. *Brit J Psychiat* 2000;**177**:484–5.
- Kapusta ND, Sonneck G. Suicides of men in Austria: an epidemiological analysis over a 30-year period. *J Men's Health Gender* 2004;**1**(2-3):197–202.
- Kposowa AJ. Marital status and suicide in the National Longitudinal Mortality Study. *J Epidemiol Commun Health* 2000;**54**(4):254–61.
- Lorant V, Kunst AE, Huisman M, Bopp M, Mackenbach J, The EUWG. A European comparative study of marital status and socio-economic inequalities in suicide. *Soc Sci Med* 2005;**60**(11):2431–41.
- Cooper PN, Milroy CM. Violent suicide in South Yorkshire, England. *J Forensic Sci* 1994;**39**(3):657–67.
- Kposowa AJ, McElvain JP. Gender, place, and method of suicide. *Soc Psychiat Psychiatric Epidemiol* 2006;**41**:435–43.
- Anonymous, editor. National suicide review G, annual Report 2000: suicide prevention, education and research, Galway: National Suicide Review Group; 2001.
- NSRF, inquested deaths in Ireland: a study of routine data and recording procedures. National Suicide Research Foundation: Cork; 2007.